

Effectiveness and Mechanisms of Action of Whitening Dentifrices on Enamel Extrinsic Stains.

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Whitening dentifrices utilize different approaches for stain removal and/or prevention, including the use of abrasive, oxidizing and chemical cleaning agents. The objectives of this in vitro study were: 1. to compare the whitening effect of commercial whitening and non-whitening dentifrices; 2. to verify the mechanism of action of whitening dentifrices by contrasting two experimental models: chemical (toothpaste exposure only) and chemo-mechanical (toothpaste exposure with tooth brushing abrasion). Two hundred fifty six bovine enamel specimens (10x10mm) were prepared and partially stained. They were assigned to 8 groups: 6 whitening dentifrices, 1 non-whitening reference dentifrice and deionized water (control); and further divided in 2 subgroups (n=16) according to the experimental models: chemical or chemo-mechanical. Specimens were daily exposed to dentifrice slurries 2x/day for 1min and brushed or not, according to each model. In between dentifrice treatments, specimens were exposed to the staining solution for 5h. This protocol was repeated for 5 consecutive days and enamel color changes (Delta E) were measured by spectrophotometry, after each day. The abrasivity of the toothpastes was determined using standard test (ISO 11609). Significantly higher Delta E values (whitening effect) were observed for all groups ($p < 0.05$), except control, when tested in the chemo-mechanical model. In this model, the whitening ability of the toothpastes was mainly determined by their abrasive levels. For the chemical model, no significant differences were observed among groups ($p > 0.05$). Whitening dentifrices can be effective preventing/removing enamel surface staining, when associated to tooth brushing abrasion. This seemed to be modulated mainly by the abrasive level of the tested toothpastes, with no action attributed to the chemical agents.

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